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Department of Otology, Laryngology and Rhinology.

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THE

OPHTHALMIC RECORD.

VOL. III. JUNE, 1894. No. 12.

RETINITIS ALBUMINURI.*

BY L. WESTER FOX, M.D.,

Professor of Diseases of the Eye, Medico-Chirurgical College,

PHILADELPHIA, PA.

The relationship of diseases of the eye to general diseases was established long before the introduction of the use of the ophthalmoscope, but by the introduction of this valuable instrument certain diseases which were only mooted, have long since been made a certainty. It is very interesting to read, in the light of our present knowledge of intra-ocular diseases, what the first Mackenzie said about this instrument. When the ophthalmoscope was first shown him and he made an examination of the eyes of several patients he said:—"The ophthalmoscope of Helmholtz, Coccius and Follin, are likely to assist in the detection of the effects of inflammation, both in the crystalline and in the vitreous body."

A fact well known to the general practitioner is that the outside of the eye presents certain symptoms as characteristic to him, as the characteristic fan shaped white spots of the retina are to the ophthalmologist.

* Read before the Alumni Meeting of the College, Feby. 16, 1894.

Oedema of the lower-eye lid is a very characteristic symptom of Bright's disease; the subcutaneous tissue being much relaxed affords a favorable ground for the development of oedema. The upper eye-lid does not present this puffiness so frequently, on account of the histological formation of the lid. Associated with this puffiness of the eye-lids, we find the muscle of accommodation also giving way, and, in reading, dimness of vision, a rapid recovery of the word, then again fading; at times want of converging power as if a row of double sentences appeared, one word over the other. This condition shows more with hyperopes, suffering with Bright's disease, than myopes. As regards the pupils, they are dilated, owing to want of controlling power of the sphincter of the iris. As regards a change in the iris itself, Leber has recognized a number of cases. In fact this writer lays so much stress on this condition that, in all doubtful cases of inflammation of the iris, he suggests that the urine be examined for albumin. Ewetsky has seen posterior synechia in iritis, in patients with albuminuria. Whether an albuminuria *causes* cataract there is still some doubt, but one is struck with the frequent coincidence of albuminuria in cataract patients. In order to explain this fact in cases of senile cataract, Michel says that it is essential to consider that cataract and albuminuria are the results of alterations produced simultaneously in the eyes and in the kidneys, from the same general cause, arteriosclerosis. This theory recalls, to a certain point, that of Sutton, who considered that interstitial nephritis and hypertrophy of the left ventricle are both caused by an alteration of the vascular walls (arterio-fibrosis.) Berger, Becker, and the greater number of those who have made a special study of this question do not believe in the relation claimed by Deutschmann between cataract and nephritis. Ewetsky, who examined 200 patients with cataract, only found 19 per cent. of these individuals afflicted with albuminuria; on the other hand he examined the eyes of 97

nephritics, of which 70 had not attained the age of 50 years, and only met with cataract in 8 per cent. of these patients, and in this number there was but one who was less than fifty. From these facts this author concludes that cataract does not show itself in young persons attacked by nephritis, and it is no more frequent in nephritics before they attain the age of 50, than in those whose kidneys are normal.

The most important tunic of the eye, which reflects the condition of the general economy, is the retina. From observations which I have made, but have not been quite able to confirm, I feel that in certain forms of retinal hemorrhage, especially of the striated variety, we have the forerunner of non-albuminuric Bright's disease. The blood vessels show a sclerosis of their coats, that is, the external coats are whitened in such conditions. We find that the capillaries also are involved in a similar manner, or, in other words, there is an arterio-capillary fibroid change, which has been described by Gull and Sutton. With patients suffering from what Dr. Mohomed would call the first, or functional stage of Bright's disease, we observe with the ophthalmoscope, a fulness of the arteries and a slight pulsation of the central artery, not unlike that which is observed in glaucoma. This is pathognomonic of high arterial tension, and when this condition exists for a longer or shorter period we have the retinal hemorrhages as described above, and yet, if the urine be examined, we find that it is absolutely free from albumin. I believe that this sclerosis may be recognized earlier than in the condition described in a very able and exhaustive article on non-albuminuric Bright's disease, by Dr. D. D. Stewart, in the American Journal of the Medical Sciences for December, 1893.

Retinitis observed in nephritis is of very great importance; it is met with in six or seven per cent. of cases of inflammation of the kidneys. It is most frequently found in interstitial nephritis, in infectious nephritis (scarlatina), in the albuminuria

of pregnancy, complicated or not by eclampsy. Albuminuric retinitis is not often seen in parenchymatous nephritis or amyloid degeneration of the kidneys. (Berger).

Heymann was the first to call attention to the retinal changes, which he regarded as characteristic in interstitial nephritis. Every ophthalmologist can readily call to mind cases in which the ophthalmoscope first revealed the existence of albuminuric retinitis, the diagnosis being subsequently confirmed by a urinary analysis. Within the last week a patient presented himself at the Eye Clinic for relief of failing vision. As is usually the case with these patients, she had first consulted the itinerant spectacle vendor for glasses, and, finding no betterment of her vision, she applied to us for relief. The ophthalmoscope revealed an extensive retinitis with extensive retinal hemorrhage. Examination of the urine showed about 40 percent. albumin by quantity. This woman, according to her history, did not complain of untoward symptoms of any kind, merely a failing of her vision.

The chief signs of albuminuric retinitis are the following :— The optic nerve seems swollen and fluffy, is of a reddish color and hazy, the vascular walls surrounding the blood columns, form white lines more or less pronounced ; these constitute the retinal white spots which were formerly regarded as the product of a fatty degeneration. The yellow spot gives star or fan-shaped alterations which at first were considered as characteristic of albuminuric retinitis, but they are now known to exist in other kidney diseases. These star-like changes consist of brilliant white spots which radiate around the macula, the spots are edged by brownish pigment and here and there show small retinal hemorrhages, desseminated through the spots or beyond in the otherwise normal retina.

It is a singular fact that in the more advanced stage the white spots, excepting those of the macula, disappear little by little ;

the edge of the optic nerve, indistinct in the beginning of the disease, again becomes apparent. Hyperæmia of the papilla disappears, the vessels, chiefly the veins are at this stage very tortuous, the thickening of the walls of the blood vessels much more pronounced than at first, and the white spots become more apparent. In certain cases of albuminuric retinitis, the star-shaped lesions are absent from the macula, while in the retina are seen curiously shaped spots of extensive area. According to Berger, one meets with (optic neuritis) papillitis, with and without the star shaped spots.

Magnus first described a special form of albuminuric retinitis, in which the inflammatory symptoms are but little marked or entirely absent.

Authorities differ as to the prognosis, in retinal hemorrhages associated with Bright's disease. Hirschberg gives a case where his patient died three and a half years after the retinal hemorrhages. We must not forget that, in albuminuric retinitis, hemorrhages may coincide with an acute inflammation of the retina. My own experience has been, where retinal hemorrhages and the colloid degenerations are coincident, that death is close at hand. The more extensive the hemorrhages, the shorter the expectation of life. The typical deposit, as seen with the ophthalmoscope, may also give us a guide as to the fatality of the disease. I may mention here that the left eye is more frequently attacked than the right. According to Liebreich, albuminuric retinitis may be complicated by diffused choroiditis, and cases are known of albuminuria with change in the choroid only, the retina undergoing no change at all. There are other cases where the little flecks in the vitreous body were the first intimation of choroidal lesion. These cases must be exceedingly rare, as, in an extensive search I have not yet been able to locate a single one. In detachment of the retina due to albuminuric choroiditis, no apparent visual change takes place,

although Anderson thought he observed it in a little girl of nine years of age. This child, after measles, was attacked by nephritis, which caused this chorio-retinitis albuminurica. This bi-lateral detachment of the retina caused blindness. Ewetsky holds that this detachment of the retina may be observed in albuminuria, without there being albuminuric retinitis. The same author proved that the condition known as scintillating synchysis, floating opacities in the anterior part of the vitreous is due to the same relative condition. The visual acuity is lessened in proportion to the pathological change which has taken place in the retina. If the lesion has extended around the macula, and the fovea centralis escapes, normal vision may exist, but if the surrounding field is infiltrated this good vision soon falls off to one-third, or may even end in blindness for *direct* vision, peripheral vision remaining. The clouded vision may be so marked that only movements of the hands can be seen. Even if the morbid process of the kidneys is modified, the prognosis of vision is very unfavorable, as secondary glaucoma may follow.

Cause.—As to the cause of albuminuric retinitis, Franke attributes it to the increased arterial tension of interstitial nephritis, but according to Cohnheim and Albutt, this disease exists without hypertrophy of the left ventricle and without increase of vascular pressure. Förster thinks that the disease is produced by alterations of the blood which cause degeneration of the blood vessel walls. Charles Theodore, Duke of Bavaria, who made a special study of this disease of the eye, found hyaline degeneration and endarteritis in the vessels of the retina; at certain places the small vessels were dilated, resembling aneurisms. The hyaline degeneration attacked the internal and middle coats of the arteries, which caused considerable diminution of their calibre. The veins, on the contrary, are dilated; at times he found small, fatty granulations

filling the cavities of the small arteries. Microscopic examination shows that small hemorrhages existing in the retina may break through this coat and extend into the vitreous body. The limiting internal membrane of the retina is generally thickened. The layers of the nerve fibres are distended and varicose, an interstitial œdema separates, more or less, one layer from the other; on the other hand the layer of the rods and cones is almost normal.

In a more advanced stage of albuminuric retinitis, a new formation of vessels and capillaries may be seen in the retina. Cavities hollow out between the fibres of Müller, and these are filled by a homogenous, albuminoid liquid, or by clots of fibrin. The fibres of Müller themselves are thickened and seem sclerosed. Later they show traces of fatty degeneration and are full of granulations or of small drops of fat. The detachment of the retina which complicates some cases of albuminuric retinitis is probably due to transudation through the walls of the vessels.

The same vascular lesions, which in the retina bring such serious consequences, provoke almost no nutritive trouble in other parts of the eye. This difference is doubtless due to the retinal arteries being the terminal arteries, while those of the iris and choroid assure the circulation of the blood, even when partial occlusions exist in these vessels. Usually the prognosis of albuminuric retinitis is grave enough and the life of the patient is seriously threatened. Nevertheless, there are exceptions:—In pregnant women there are many cases of complete cure, the sight becoming normal and the general health re-established. It may be, moreover, that, in spite of a greatly improved condition, the albuminuric retinitis of pregnancy does not disappear, the optic nerve is atrophied and some of the retinal vessels are transformed into fibrous fasciæ. (Berger.) The patient survives, but the visual acuity is diminished, and, when pregnancy occurs again, albuminuria reappears at the same

time with the disease of the retina and the patient dies (Fuerst). Following scarlatina, the cure of renal and retinal lesions has often been seen. In a certain number of cases of albuminuric retinitis, due to interstitial weakness, the sight is more or less weakened and finally convulsions and amaurosis ensue. The greater number of patients attacked by albuminuric retinitis succumb to kidney disease or its complications (cerebral hemorrhage or pulmonary œdema).

Miley, in order to emphasize the gravity of the prognosis, examined 164 patients attacked by kidney disease (nephritis), and the back of the eye was normal in 105 of these patients; in eight others were lesions noticeable by the ophthalmoscope, but without connection with the kidney disease; 51 presented symptoms of albuminuric retinitis. In the two following years, of the 105 cases which had no eye complications, 28 died; of the 51 attacked by albuminuric retinitis, 27 died. Consequently mortality is twice as great in those attacked by nephritis without ocular complications. The majority of the patients lived but twelve months after the day when the retinal disease was diagnosed; one alone lived 18 months. (Berger).

1304 Walnut St.

I am indebted to Prof. Anders, Drs. Stewart, Daland and Bordman Reed and to Berger's magnificent work "On the Relation of the Eyes to General Disease," for information and statistics in the above paper. F.

ASTIGMATISM.

I. CAUSE AND STATISTICS.

By C. M. HOBBY, M.D., Iowa City, Iowa.

In approaching the consideration of the causes of astigmatism we are met at the outset by a remarkable insufficiency of detail concerning the embryological and comparitive anatomy of the eye. It has been the general impression that astigmatism was usually congenital, but if we search for data upon which this opinion is founded, the little that rewards the effort is very unsatisfactory. The tendency to look at the eye purely as an optical instrument is very natural; we should all be glad to have as much exact science as possible in the study and practice of medicine, but the effort at too great rigidity of laws and rules, in so complex a piece of mechanism as a vital organism, is prone to warp the practical application of our knowledge away from the best results. And so, in considering the causes of astigmatism, we must recognize the plastic nature of the structures of the globe, that at the time of birth, a weight of a few grains will change the shape of the cornea, and that the lens is so nearly in a fluid condition as to change its shape, by its own weight, if allowed the opportunity. We have reason to believe that the retinal image, in nearly if not all of the mammalia, is less perfectly formed than in man; a dog will scarcely recognize his master by sight at fifteen feet, and the mare will not recognize her own foal by sight many feet, while she will tell the foot-falls of her stable companions rods away. Birds are credited with great acuteness of distant vision, but the wary wild-goose is deceived, by decoys and disguises, at distance that would render them unavailing to deceive the

average human eye. We may I think accept the acute vision of birds of prey, and we have sufficient evidence that the nomadic tribes of man, possess greater acuteness of vision than is common amongst the more civilized races. We find the vision of those immediately decended from the pioneers of the country to be much more acute, on the average, than that possessed by their cousins in town. Those of us practicing in the western states, see less myopia in proportion to the number of cases of refractive error than those in the large eastern cities, just as the proportion in New York is less than in Berlin.

It is doubtful if primitive man derived much advantage from superiority of vision. It seems more probable that this was a later acquisition, the result of human competition and conflict, and, though shared by the female, predominated in the male; and it appears even amongst the civilized races that the male possesses a superiority in visual acuteness just as the female is superior in color sense.

The location of the point of fixation, which determines the angle alpha is of importance in the production of astigmatism of small amount, and in determining the axis; but how the point of fixation is produced, and whether it is developed, and determined before birth, are questions that must receive more attention from the embryologist, before we can consider this as a prenatal cause. We are left then in regard to congenital causes of astigmatism, to the influence of reversion, and to the occurrence of malformations, as the only explanations, so far advanced, with probability in their favor.

In childhood, if we leave out the consideration of the fixing point as evolved by the experience and practice of the individual, we find numerous causes for the production of astigmatism. Recalling the anatomical condition, we cannot help believing that causes which operate elsewhere to determine the shape of the head, that influence the development of the features, and

mould and modify throughout the body, are competent to change the curvature of the cornea. And first amongst these causes is pressure. Pressure of the lids is capable of modifying, temporarily, the corneal curvature well along in life; in infancy the pressure of the lids meets the globe in a plastic form and if continued, such pressure must produce permanent modification of shape. If we examine numerous individuals we will find considerable diversity in the development and distribution of the bundles of muscular fibres constituting the orbicularis muscle. The part of the globe receiving the maximum pressure depends in part upon the amount, with the adult usually the beginning of such pressure is upon the inferior internal quadrant, a slight increase brings in the superior internal quadrant, and pressure may be made on the upper half greater than the lower, or the reverse; causes for such continuous pressure as to be competent to produce astigmatism are sufficiently common, and frequent. The irritation of conjunctivitis, the intolerance of light in the phlyctenular inflammations, the irritable eyes following the exanthemata, are all in evidence as thoroughly competent, and further, it is rare to find cases that have suffered from phlyctenular keratitis, without astigmatism. This has been often noticed, and the causative relation reversed.

For the asthenopia of children measles is often assigned as the cause, by parents, and in such cases astigmatism is the rule. In hyperopes the contractions of the palpebral fissure involuntarily made, to sharpen the image, lend themselves to the perpetuation of increased vertical curvature of the cornea, and so occasionally the same result proceeds from the habit of pressing with the finger upon the globe, covered by the lid, for a similar purpose.

It may be questioned whether undue prominence has not been given to lenticular astigmatism. It is apparent from the results of investigation with the ophthalmometer, that in a conservative

way the lens becomes changed in curvature to lessen the effects of corneal astigmatism, and that it seldom happens that the total astigmatism is greater than the corneal, or that lenticular astigmatism exists when the cornea is free from it. Interesting cases of lenticular astigmatism have been reported, but they are so rare that the suggestion of pathological cause may be raised in regard to them. The writer has observed one case in which the lens, had much greater refractive power in the upper hemisphere than in the lower, very much as though a fluid lens had become solid in the position determined by gravity in the vertical position. Cases of displacement of the lens, requiring detatchment from the zonula, must be considered as pathological, and the excentric and non-parallel positions of the lens congenitally, are to a great extent remedied by the conservative re-modeling heretofore referred to. In the few cases observed where the total astigmatism seemed to be 0.25 or 0.50 D. more than indicated by the ophthalmometer, it may be that more complete mydriasis would have removed the apparent discrepancy.

In the table attached the results of careful measurements of 500 consecutive cases of astigmatism are given. The cases extend over about nine years of work, and are principally from among students and professional people; all were private cases, and no case was recorded without sufficient time was given for careful investigation. The results as given by the ophthalmoscope, were compared in every instance; usually a mydriatic was employed, always in myopic cases; and the mydriatic employed was usually homatropia, although in cases of doubt atropia, was subsequently used to clear up possible insufficiency of action in the milder mydriatic. Retinoscopy has been of great assistance in the very young, and the ophthalmometer, since acquiring experience in interpreting its results, has proven of the greatest value in facilitating accurate determination of astigmatism. All tests of vision have been repeated with

changed cards, in order to eliminate errors on the part of the patient. At least 70% of the measurements have been made at an actual 20 feet distance, and a single letter missed has counted as complete failure for the whole line. It is believed that the care taken to eliminate the errors, resulting from the patient's remembering test letters, and acquiring familiarity with the card, is well compensated for in the result obtained.

The 500 cases presented 876 eyes with astigmatism, which would indicate that 75% were astigmatic in both eyes, this differs slightly from Burnett's statistics, * his cases showing but 69%, astigmatic in both eyes (his book says 41% unilateral, but this is an evident misprint for 31%).

Of the 500, 315 were females, being 63% as compared with Burnett's 58%. Doctor Burnett attributes the preponderance of females in his statistics to the fact that his clientele is drawn largely from the clerical force at the capitol, where the work is of such a nature as to cause small errors in refraction to be felt, especially by women. I cannot explain the much larger proportion of females in my cases in this manner. Amongst the students and professional people from whom I draw my patronage, the male sex predominates. In over 1300 cases of refractive error, there have been 58% females.

Astigmatism in my records is considered as a positive quantity always, although in the correction by glasses negative cylinders are employed when they possess any advantage; this method of recording cases clears up at a glance, the axial relations of the astigmatism and facilitates simplicity of prescription.

Considered in the usual way the 876 astigmatic eyes presented the following proportions.

Simple hyperopic astigmatism .....306 or 35%.

Compound hyperopic astigmatism . ..234 or 27

* A Treatise on Astigmatism. Swan M. Burnett, M.D., St. Louis, Mo., 1887.

Simple myopic astigmatism..... ..151 or 17
Compound myopic astigmatism .....138 or 16
Mixed astigmatism..... ..... 47 or 5

In comparing this with the proportions of Doctor Burnett, the preponderance of hyperopic cases, exceeding 60% is marked, and I believe solely attributible to inheritance; if the cases of American parentage were taken by themselves, the proportion of hyperopes would be much greater, probably reaching 80%.

The meridian of greatest refraction as observed in the same cases, considering astigmatism always positive, was as follows:

Meridian ..... 90° 499 eyes = 57% "with the rule."
Meridian.....180° 83 eyes = 8 "against the rule."
M. symmetrically oblique 92 eyes = 10%.
M. parallel..... .....20 eyes = 2
M. irregularly oblique .. 192 eyes = 20

The proportion of symmetrically oblique cases would be greatly increased, if those differing but 5° were added to the list. The acuteness of vision, finally obtained is given for the different amounts of refractive error.

I. Simple and compound astigmatism less than 1.00 D. 287 eyes.

S. = $\frac{20}{20}$ or better..... ... ... 221 eyes.
S. = $\frac{20}{30}$ " ..... 56 "
S. = $\frac{20}{40}$ " .... 7 "
S. = $\frac{20}{50}$ " .... 1 "
S. = $\frac{20}{60}$ " .... 2 "

II. Simple and compound astigmatism 1.00 D. to 2.50 D. 319 eyes.

S. = $\frac{20}{20}$ or better..... ..... 207 eyes.
S. = $\frac{20}{30}$ " .... 62 "
S. = $\frac{20}{40}$ " ..... 20 "
S. = $\frac{20}{50}$ " .... 11 "
S. = $\frac{20}{60}$ or worse..... 9 "

III. Simple and compound astigmatism 2.75 D. and greater, 270 eyes.

S. = $\frac{20}{20}$ or better..... ..... 76 eyes.
S. = $\frac{20}{30}$ " ..... 63 "
S. = $\frac{20}{40}$ " .. .. 41 "
S. = $\frac{20}{50}$ " . ..... 37 "
S. = $\frac{20}{60}$ or worse .... 63 "

This shows that of the first class 77% got $\frac{20}{20}$ or better, and 99% got $\frac{20}{30}$ or better; of the second class 65% got $\frac{20}{20}$ and 87% got $\frac{20}{30}$ or better: while of the third class only 20% got $\frac{20}{20}$ or better and only 51% got $\frac{20}{30}$ or better. Taken together 57% got $\frac{20}{20}$ or better.

In Doctor Burnett's cases $\frac{20}{20}$ was obtained in only 36% of the total. As my cases do not present a larger proportion of low degrees of error than his, the greater percentage of acute vision obtained is probably due to the preponderance of hyperopic cases.

THE TREATMENT OF PTERYGIA WITH THE GALVANO-CAUTERY.

By ARTHUR G. HOBBS, M.D., Atlanta, Ga.

I shall not presume that it is necessary in describing this method of operating on pterygia to even enumerate the many already in vogue. I should rather ask your forbearance for merely suggesting to you that yet another method is to be added to the list already, perhaps, too long; still it may be true that each of these operations have served its purpose in turn, in the process of evolution. Since it is the cardinal point in making a pterygium operation to prevent two raw surfaces from remaining in apposition after the operation, which necessarily results in the relapses which we too frequently see, why not

then convert each of the raw surfaces into an eschar at once to avoid such failures, provided we are able to demonstrate practically that this means will bring about that desired result?

For some years the galvano-cautery point has been resorted to in corneal ulcers, particularly in those indolent and intractable ulcers which have refused to yield to other methods of treatment. It was suggested to me a few years ago, after seeing some of the beautiful results of the cautery when applied to ulcers of the cornea that it could, at least, produce no bad results, if properly applied to the neck of a pterygium for the purpose of cutting off the nutrition of its corneal apex. I hoped that it would prove a better means of severing the arterial supply to the apex as it crossed the sclero-corneal junction. This object is generally attained by the use of the knife, and various methods have been resorted to, to accomplish the purpose. The failures in pterygium operations are usually due to the resulting re-establishment of the arterial circulation and when this occurs the desired end of the operation fails in proportion to the number of the re-established vessels. The great vascularity of a pterygium, with its vessels crossing over the sclero-corneal line to supply its apex on the cornea renders it difficult to permanently sever all the arteries by a clean cut with the knife, hence perhaps a score of different methods of knife and scissors operations have been resorted to by different operators to accomplish this end.

Each operator aims at one end primarily, and that is to completely cut off all the blood supply from the corneal apex. Secondarily, his desire is to destroy as little conjunctiva as possible. When the first end is attained the corneal part of the pterygium has lost its direct nutrition and can then only share with the cornea proper for its sustinance, which is indirect, or by imbibition. As this meagre supply proves insufficient and the partial, or almost complete, obliteration after

a time will depend upon the activity of the absorbents. For this reason the best results are obtained in younger subjects in which as a rule, the lymphatics are more active, as is also the contractibility of the arterial coats.

In many cases when the knife is resorted to a secondary pterygium results in which sufficient nutrition is re-established to the apex to perpetuate the corneal haziness even beyond its apparent margin to greatly interfere with vision. When the cautery section is well made I have not seen these secondary results that are often so difficult to prevent by a clean cut with the knife or scissors. In some cases, however, it may be best to combine the methods of operating, as I have done in two cases not included in this report. These two pterygia were extremely vascular and muscular hence I first used the knife in the usual way and then seared the divided edges with the cautery blade to prevent the secondary results.

The fine pointed cautery blade, heated with a battery that can be perfectly gauged and always relied on, is applied horizontally to the narrowest portion of the growth which is near the sclero-corneal line; the touch is made at the moment white heat is reached and should be almost instantaneous, and reapplied as quickly if the tissues are not at first completely severed. If the growth is not adherent to the sclera and corneal margin it is best to grasp it with small forceps and slightly raise it from the sclera. When the forceps are used it is easier to be certain that the cautery has made a complete section of all the hypertrophied and over-vascular conjunctival tissue.

Where the corneal head is large and protruding it is advisable to make a cautery application in the same manner as in applying it to a corneal ulcer. In both cases the resulting cicatrix is less—it is more transparent. This is not altogether an unknown fact, but one that has seemed never to have been brought out as prominently as its importance would suggest. For this

reason one may be tempted often to resort to the cautery to reduce a large pterygium apex or a corneal ulcer, for the purpose alone of attaining this corneal transparency. The resulting eschar so completely severs the vascular connection leaving no raw surfaces in apposition that a re-established circulation is practically impossible: this can not be said when the knife or scissors have been used. In case the redundancy of tissue at the point of section should seem to require reduction, the scleral end of the section may be turned under and a transverse suture introduced.

I have made this operation fourteen times, and would have made it half as many more times during the last two years, but for that decided objection to the cautery which we so often meet with and are bound to respect. This operation is more quickly performed; it is followed by no bleeding; it leaves no ecchymosis; the wound heals more rapidly; there is less pain during and after its performance; it requires no bandages and the corneal haziness around the apex is less.

A weak solution of cocaine, about a two per cent., is first dropped into the conjunctival sac, then after about five minutes a stronger solution, about a ten per cent., is applied at intervals, locally, by means of a small cotton probe, for five minutes more, in the mean time the lids are held open. By this means the toxic effects are avoided except in those subjects that are unusually susceptible to cocaine. In using cocaine, in this latter strength, I try to avoid as much as possible, by the position of the patient, its contact with the cornea. It is now a well known fact that when used in this strength, or even when much weaker, that this drug is disastrous to an abraded cornea if long continued.

The kind of galvano-cautery apparatus, the ease of its manipulation, the size of the blade, the confidence of the hand that presses the button, the requisit degree of heat, which should be

gauged by the turn of the screw, are some of the necessary factors in this seemingly simple, yet delicate, little operation, whether it be made to a corneal ulcer or to the neck of a pterigium. The only galvano-cautery apparatus in my knowlrdge that I would now be willing to trust for these purposes is the "Transformer" of the alternating current of 52 volts.

I am now using, in my consultation rooms, the first two of these little instruments made.

I described the varied uses and advantages of this "Transformer" in a paper read before the Pan-American Congress last fall. So far as I know, the galvano-cautery has not hitherto been used as a means of cutting off the nutrition of the corneal apex of a pterygium.

THE USE OF THE ELECTRO-MAGNET IN REMOVING FOREIGN BODIES FROM THE EYE.*

By ALBERT RUFUS BAKER, M.D.,
Cleveland.

While a student in Berlin, in 1882, I first saw Dr. Hirschberg make use of the electro-magnet for the removal of foreign bodies from the eye-ball. The magnet he used at that time would only lift about twelve or fifteen ounces.

Immediately upon my return home, in the Fall of 1883, I had constructed this magnet, which I have the pleasure of showing you to-day. It will readily lift five or six pounds, and is but slightly heavier or more cumbersome than Prof. Hirschberg's magnet.

Owing to the inconvenience of transporting a fluid batter, Mr. Shackleton, my student, has constructed this dry-cell battery, which has been in use about four months, and so far as I can

* Read before the Ohio State Medical Society, June, 1893.

see, is just as strong as ever. The principal objection to dry-cell battery is, that it will finally become exhausted, and the cells will have to be replaced by new ones. But I have no doubt they will last three or four years with the use an oculist requires of them; and as they only cost from fifty to seventy-five cents for each cell, the expense is not as great as that of rechanging an ordinary fluid battery. Six cells are used; they are hermetically sealed, and can be upset, or carried upside down, without any fear of damage.

During the past ten years I have probably made use of the magnet in one way and another in a hundred cases, and yet it is doubtful if its use has been of permanent value to patients in more than ten per cent, but it has been of use as a means of diagnosis in a number of cases.

In a few cases the results of its use have been brilliant, but these occur at such long intervals that the practitioner is often inclined to become discouraged in its use. One of the first patients in which I used it successfully was a child with a small chip of steel in the anterior chamber. The foreign body was removed so quickly and easily that is was with considerable pleasure that I undertook to remove, some months later, a small piece of the head of a nail from the viteeous humor of the eye of a young man, a carpenter, from Meadville, Pa. The piece of iron was very small, not much larger than a pin head, but could be seen with the ophthalmoscope as a bright, beautiful spot, almost in the center of the vitreous. I made an opening in the sclerotic, opposite the foreign body, and upon entering the point of the magnet could hear the peculiar click indicating that it had come in contact with the piece of iron. Upon withdrawing the magnet it failed to follow. Notwithstanding repeated introductions of the magnet, I failed to secure it, and finally enucleated the eye. When I opened the eye-ball, and laid it upon the table, and appled the magnet, the iron would be drawn

to the magnet, and pull out the vitreous perhaps an inch, like a piece of rubber; in fact, I could lift the entire eye-ball off the table with the magnet In the light of my present experience, I think this eye was needlessly sacrificed, as I do not think that a piece of iron so thoroughly encapsulated could have done much harm if permitted to remain in the eye. I must confess, that this experience somewhat lessened my ardor in the use of the magnet, although I have had several cases since in which it has proved of great service. One case I recall, a Mr. Smith, from Conneaut, referred to me by the late Dr. Weed, who was struck in the eye by a scale which made a clean cut on the inside of the eye-ball, which the Doctor supposed to be conjunctival only; he put in a stitch, and when I saw the case afterward, the anterior chamber was filled with blood. Upon bringing the magnet near the eye-ball it would follow it, and the patient would complain of pain. I knew at once that there was a foreign body in the eye; removed the stitch, and upon applying the magnet to the wound, withdrew a scale of steel as large as the nail on my little finger, and about the same shape. The eye made a rapid recovery, retained its natural size and appearance, but no useful vision. Another somewhat similar case was that of a young boy who, with some companions in the country, was playing "Warriors Bold—Knights of Old," with a couple of old axes, which they were slashing together, when a large three-cornered piece penetrated the eye of one of the boys. It was easily removed from the vitreous chamber with the electro-magnet, but it became necessary some time later to remove the eye for fear of sympathetic inflammation of the good eye.

This is the usual course these cases of foreign bodies in the vitreous pursue. There is so much injury done by the penetrating wound, that the eye is necessarily destroyed, even though the foreign body is removed, or, escaping this, a sympathetic inflammation is excited.

Recently, a somewhat more favorable case came under my observation. A young man, working in one of our large manufacturing establishments, was struck in the cornea with a small piece of steel, which was rather deeply embedded in the substance of the cornea. The physician, attempting to remove it, pushed it into the anterior chamber. The case was then referred to me. The piece could be seen distinctly at the lower part of the anterior chamber. Upon placing the magnet at the point of entrance, the piece of steel would jump up to it. Upon removing the magnet, it would drop to its former position. The wound was slightly enlarged, and it was easily removed with the magnet.

The electro-magnet has, in a number of instances, proved of great value to me in making a diagnosis.

In cases in which there is a piece of iron or steel in the eye, when the strong magnet is brought in contact with the eye-ball, and carefully moved in one direction or another, the ball will move with it, and the patient will complain of pain in the eye when the magnet is brought near it. Much care will have to be exercised or the surgeon will be misled by the patient's statements.

Prof. Stilling, I believe, has suggested that an immense magnet connected with a large dynamo might be used, so that when applied to the surface of the eye-ball it would draw the steel through the tissues of the eye. If such a strong magnet should prove successful the expense would be too great for any one surgeon, but in a large city, where several oculists are engaged in practice, some hospital ought to be induced to put in such a magnet, and all the oculists, as well as other physicians, would be only too glad to send all their patients to an institution supplied with such an apparatus.

My experience would lead me to conclude that the electro-magnet has a limited field of usefulness in the removal of foreign bodies from the vitreous; that it is of much greater use in removing substances from the anterior chamber, iris and lens, and that it is of considerable value as an aid to diagnosis.

A NOVEL METHOD OF CORRECTING ASTIGMATISM

By S. MITCHELL, M.D., Hornellsville, N. Y.,
Oculist and Aurist to St. James Mercy Hospital, Consulting Surgeon to the Hornell Sanitarium.

Several years ago I was consulted by Mr. B., a nimrod of this city. He had just returned from the chase, and the same afternoon while "beating the bush" for game, he had the misfortune to wound his right eye. The cornea was punctured by a small twig, near the sclero-corneal margin in the upper nasal quadrant.

When he reached my office the anterior chamber was empty, and a small hernia of iris was protruding from the wound. It being impossible to replace this protruding portion it was excised. The eye healed nicely, and during one of the subsequent visits to my office Mr. B., remarked that his sight had always been rather poor, and he was desirous of having glasses fitted; and so after the injured eye was entirely well I examined the eyes with this end in view. His vision was as follows:

V. O. D. $= \frac{18}{200}$ with $+ 2.25 \bigcirc - 4.50$ cyl. axis $120° = \frac{18}{16}$.

V. O. S. $= \frac{18}{30}$ with $+ 1.50 \bigcirc - .2$ cyl. axis $60° = \frac{18}{18}$.

Owing to numerous irregularities in the surface of the cornea, I could get no satisfactory results from retinoscopy in the right eye; but in the left the result was M $= 1.25$ D. in the meridian of 150° and H. $= 1.25$ D. in the meridian at right angle to this viz, 60°.

I did not possess an ophthalmometer at the time the first examination was made, but at a more recent one the following record was made with this instrument, and added to my notes: O. D. 8. D. axis 30°. O. S. 3. D axis 120°. There was esophoria of 3° for distance, and as my patients sporting proclivities were in no way diminished by the accident spoken of above, and he being satisfied that his distance vision, so essential in the chase, was much improved by the addition of the prisms, the following glasses were prescribed:

O. D. + 2.25 ⌓ — 4.50 D. cyl. axis 120° ⌓ 2° prism base out.

O. S. + .50 ⌓ — 2 D. cyl. axis 60° ⌓ 1° prism base out.

These glasses he is still using with comfort.

Recently he called to consult me about a slight deafness, and while in my office he gave me a demonstration of a novel method of correcting his astigmatism without glasses, that he had hit upon, viz, of applying slight pressure to the eye-balls by placing the tips of the fore finger against the lids and applying the pressure either at the lower nasal or the upper temporal quadrant of both eyes. By this simple procedure his vision could be changed in the right eye, from $\frac{18}{100}$ to $\frac{18}{15}$, and in the left from $\frac{18}{30}$ to $\frac{18}{15}$. This high standard of vision was of course only maintained as long as the pressure was kept up. It will be seen that the points selected for applying the pressure corresponds to the hyperopic meridian of either eye viz. 120° in the right and 60° in the left.

The explanation of the phenomenon is simple: As the convexity of the hyperopic meridian of the cornea was *increased* by the pressure, the convexity of the myopic meridian was *diminished* accordingly until a perfect uniformity of curvature was established in all meridians and emmetropia resulting, vision was normal.

He informed me that he frequently employed this method of improving his vision for a moment, when he wished to view some distant object quickly. His glasses being in his pocket, it was much more convenient to apply the tips of his fore-fingers to the eye-balls and press his biased cornea into shape, so that they might perform their office perfectly, than to put on his spectacles and let a pair of cunningly wrought lenses assist them. He was anxious to know if there was not some means known to surgical science, by which a "tuck" could be taken in the sclerotic at the corneal margin that would permanently establish a perfect uniformity of curvatnre in all meridians of the cornea.

I was obliged to inform him that, although I had been bold enough to produce astigmatism, in numerous instances, by an operation upon the eyes, never-the-less I felt very timid, and altogether too incompetent to undertake to remedy the error by an operation.

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THE EIGHTH INTERNATIONAL CONGRESS OF OPHTHALMOLOGY

Which meets in Edinburgh on the 7th of August to remain in session until the 11th, will be presided over by Dr. Argyll Robertson. Several hundred oculists, in different parts of the world, have already signified their intention to attend and the meeting therefore promises to be a full one. One of the subjects to be discussed is Intra-ocular Therapeutics. Other important, and yet unsettled, questions pertaining to Ophthalmology will doubtless receive due consideration. Alto -

gether the meeting will unquestionable be a very important one to all who attend. The membership fee will be £ 1 ($5.00) which can be sent in a postoffice order to Dr. Geo. A. Berry at the time of giving notification of intention to attend. The titles of papers should be sent in at as early a date as possible, certainly not later than July first. Papers on anatomical subjects and those giving statistical reports should be communicated in abstracts.

Membership fee will entitle the member to a copy of the transactions. Since no copies will be sold it will be necessary to attend in order to be a possessor.

The Paris will sail from New York on the 18th. of July. Those taking passage on this steamer will arrive in England in time to become thoroughly rested before the meeting of the British Medical Association at Bristol. The Section of Ophthalmology of that Association will be in session from the 2nd. to 5th. of August. Many who will be in attendance on that meeting will go direct to Edinburgh from Bristol. The editor of this Journal hopes to meet many of his American confreres both at Bristol and in Edinburgh.

VOLUME III

Of the *Record* closes with this issue. For it the year has been a prosperous one from both a financial and literary point of view. Self-supporting from the beginning it has had no struggle for existence, and now at the end of the third year its perpetuity is assured.

Four hundred and eighty-two pages of reading matter have been given the subscribers during the year, the practical nature of which has not been surpassed by any other journal devoted to any specialty. The best thoughts of some of our best men have found expression in this volume. The variety of subjects discussed and the number of authors contributing are shown in the index contained in this issue.

While both time and money have been freely expended by the editor, he delights to confess that the richness of the volume is due to the many who have aided by subscribing and contributing. In helping the *Record* they have been helpful to one another, as has been confessed many times by those deriving benefit. To all who have in any way aided in the work of the year the editor presents his hearty thanks; and hopes their interest in the *Record* will never fag.

In passing out of the old year we go into the new with every assurance that

VOLUME IV

will compare favorably with any of its predecessors. The future is rich with promise. Several papers for the new volume are already at hand while there are others in process of preparation. Our prospective colaborators are many and the fruits of their labors will be abundant.

As in former volumes so in this, the scientific proceedings of the Section of Ophthalmology of the A. M. A. will be given our readers. Abstracts of all papers with the elicited discussions will be published as rapidly after the San Francisco meeting as may be possible. A full report of the scientific work of the International Congress of Ophthalmology which meets in Edinburgh, Aug. 7–11 will appear in the pages of the *Record*, as will also the work of the Ophthalmic Section of the British Medical Association which meets in Bristol, Aug. 2–5.

The material coming from these three sources will be worth more, far more, to any reader than the amount of his subscription to the *Record*. But this will constitute only a part of the value of the coming volume. Can any Oculist afford to miss what is promised?

OBLIQUE ASTIGMATISM

Is a condition not as easy of correction as some think. In fact its study and correction constitute the most complicated work we have. Steele's rule for placing the axes of correcting cylinders in oblique astigmatism would be perfection itself if the oblique muscles were always harmonious. This rule as many of the readers of the *Record* will remember is: "In those cases in which the axes of the proper convex cylinders for the two eyes diverge, place the cylinders at those points which will give the axes the greatest divergence permitted by the tests; and in those cases in which the axes converge, place them at the points which will give them the greatest convergence permitted by the tests." By substituting *least* for *greatest* and *vice versa*, the same rule applies to concave cylinders.

"There is no rule without exceptions" applies to the Steele rule, but the exceptions in this instance should have only a temporary application. That the reasons for these exceptions may be clearly understood, it may be stated that in any form of uncorrected oblique astigmatism (hypermetropic, myopic or mixed) if the meridians of greatest curvature diverge above there is a consequent strain on the superior oblique muscles; if these meridians converge above there is then, necessarily, strain on the inferior oblique muscles. If in any of these cases the strain is on the superior oblique muscles (meridians of greatest curvature diverging above) and these muscles are insufficient (cyclophoria superior) Steele's rule holds good, but if in this condition the inferior obliques should be insufficient (cyclophoria inferior), the rule should be reversed temporarily. Again when the meridians of greatest curvature converge above and there is cyclophoria superior, Steele's rule for placing the axes of the cylinders must be reversed for the time, whereas if there is cyclophoria inferior the rule should be followed.

The following case will illustrate:

The lady had always been a sufferer with headache. Her refraction error was corrected, in right eye, by + 1 00 cyl. ax. 70°, and in left eye, by + .50 cyl ax. 110°.

In this case the meridians of greatest curvature converged above and therefore necessitated strain on the inferior obliques. Her superior obliques were insufficient (cyclophoria superior). She could see about as well with the axis of right cyl. at 75° as at 70° and that of the left at 105° as at 110°, but following the rule of practice, the axes were placed respectively at 70° and 110°. The result was that the patient was less comfortable with than without the lenses; for with the lenses on the strain on the inferior obliques was relieved and the superior obliques, naturally too weak, were forced into unusual action in order to parallel the naturally vertical meridians, which before had been kept slightly divergent by the inferior obliques. Exercise of the superior obliques was attended by such pain that it was not persisted in. The patient read with far more comfort when wearing simple spherical lenses than when using those more accurately adjusted. Having arrived at the conclusions embodied in this editorial, from a more careful study of oblique astigmatism, the right glass was revolved through an arc of 10° (from 70° to 80°) and the left from 110° to 100° and the patient was asked once more to wear her spectacles, with the assurance that now she would experience comfort Formerly she had been able to wear them not more than an hour, because of the severe suffering brought on by them. She reported a week later having worn her glasses with relief during the whole time. She had also been able to endure the exercise of her superior obliques. A week later she gave another favorable report, and again, at the end of another week her report was good. During this time the vision was not as acute as when the cylinder was at 75° or even at 70° for right eye and 105° or 110° for left eye. As the development of the superior obliques goes on the axes of these cylinders will be shifted by degrees back to the points giving the sharpest vision and the patient will still have comfort.

The revolution of the cylinder in this case so displaced images as to throw strain on the inferior obliques in both eyes, and thus gave the naturally too weak superior obliques relief. Other cases could be given, but a paper on this subject is now in process of preparation.

Department of Otology Laryngology and Rhinology.

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FOREIGN BODIES IN PHARYNX AND LARYNX.

BY GEORGE BROWN, M.D., ATLANTA, GA.

(REPORT OF CASES.)

It has been truthfully said that a list of foreign bodies that had been found in, and removed from, the pharynx and larynx would comprise almost everything that the mind of man could think of. The varied substances that have been removed by different surgeons, would comprise a rare and curious collection, ranging from steam engines (toy) to leeches and from cedar pencils to pen knives.

I will instance a few cases from Dr. Hobbs' note-book, embracing some of the foreign bodies most frequently found in this region.

PIN IN THE PHARYNX.

CASE NO. 1. Six weeks after the accident, I detected what proved to be a pin at the bottom of a large abscess, in the lower pharynx, just below the right posterior pillar in a woman age thirty-two. The entrance of the foreign body was unknown to the patient, until after its discovery and extraction. The persistence of the many aggravated symptoms and the abscess itself, caused the patient to go through several hands before I saw her. Fortunately, in my efforts to probe the abscess to the bottom, I found its cause and extracted the pin at the first sitting; healing rapidly followed.

PIN IN LARYNX.

Case No. 2. A girl aged fourteen, accidentally got a pin lodged in her larynx. The pin pierced false band near its inner edge, thence across the glottic Slit and through the right cord. The history and symptoms of this case, were very similar to case below of tack in larynx. After much difficulty, on the following morning, the pin was grasped midway with a McKenzie's forceps and forcibly dislodged. The œdema rendered it impossible to see the head of the pin but the consequent laceration produced but little bleeding, although the pin came out bent almost double But little aphonia resulted and none of the dangerous symptoms of the case below followed the immediate extraction of the foreign body.

TACK IN LARYNX.

Case No. 3. John H., aged twenty-two, by a sudden inhilation, drew an ordinary carpet tack into the glottis. The sharp end penetrated the left cord and the head lodged beneath the right. When I first saw the patient, twenty-four hours after the accident, the œdema had become so great that asphyxia seemed imminent; this condition had been gradually increasing for twelve hours. Jnstruments were ready for a tracheotomy but finally after many repeated attempts, I obtained a glimpse of the condition of the glottis and the position of the foreign body. When by repeated trials, though not succeeding again in getting a good view, I grasped the tack about midway between its point and head with a modified duck bill forceps. Considerable force was necessary to tear it from its œdematous bed; an alarming paroxysm of coughing followed with considerable bleeding. Each minute at this time was an anxious one. Both O'Dwyer's tube and tracheotomy instruments were ready for immediate use but after some moments the bleeding had so much reduced the glottic stenosis, that the patient passed the dangerous point and slept after a few hours. Resolution was rapid, except that aphonia lasted about six weeks.

A COCKLEBURR IN LARYNX.

Case No. 4. A boy aged eight was brought to my office by two physicians, that I might make a laryngotomy for the removal of a cockleburr but after a cocaine spray and a laryngoscopic examination, the burr was seen to be lodged just beneath the glottic opening and was extracted without much difficulty with the long curved forceps. Strange enough, there was no aphonia the voice only showing a slight hoarseness for a few days. Recovery was complete.

FOREIGN BODY IN NASAL PASSAGE.

Case No. 5. By a mere coincidence the next case I saw was one of complete sphonia, in a child of four years, produced by the lodgement of a shoe button in the post-nasal space. The foreign body, from the history of the case, had been pushed into the nose four months before by the little one and the loss of voice had existed for six weeks. The sequel proved that the foreign body was the cause of the aphonia as the first effort at vocalization after its extraction was successful. The voice continued good. The reason for mentoning the above case in this connection is obvious. There was no aphonia in the last case, when the cords were directly involved and yet a total loss of voice followed the distant lesion in this case. This is the so-called laryngitis, that is found so often (?) and exists so seldom—of the so-called laryngitis, perhaps 90% are due to nasal reflexes and exist only through subjective symptoms.

I will also add some cases recently seen in my own room.

A PIECE OF MEAT IN GLOTTIS.

Case No. 1. Gentleman, age sixty-six, farmer, eating breakfast of "spareribs," suddenly felt a choking sensation. Living ten miles from the city, he was hurriedly driven into town for relief. As he had a very sensitive throat, I first sprayed it well with a cocaine solution, then found imbedded in the glottis what proved to be a very large piece of meat, very tough and fibrous.

It was easily removed with long curved forceps, giving the patient instant relief and use of his voice.

A PIECE OF BONE IN LARYNX.

Case No. 2. A gentleman aged thirty-five, while eating a luncheon composed of a beef stew, suddenly felt something slip into his larynx. After using a cocaine spray, a piece of bone was seen lying across the glottic slit, one end of which was imbedded in the ary-epiglottic fold between the base of the epiglottis and the cartilage of Wrisberg. The bone being perfectly white, was easily seen and as easily removed. It was triangular in shape, nearly ¾ of an inch in length and tapered to a very sharp point at the apex; perfect recovery.

We are often consulted by patients who think they have a foreign body in the throat and are loath to believe that such is not the case. I will mention a few such instances:

REFERRED TO ME BY DR. C. EVANS JOHNSON.

Case No. 1. A negro woman, age thirty-five, said she had a fish scale in her throat, that had been troubling her for fifteen years. Nothing whatever could be found, except a sensitive area of pharynx. Decided hypertrophy of the middle turbinate bone on the affected side was, in my opinion, the cause of her symptoms. She refused any treatment and I saw her no more.

Case No. 2. Negro waiter aged forty, had swallowed a dime given him as a "tip" by a gentleman, eight years ago. It was a very migratory coin as at times he felt it on one side and suddenly it would change to the other. When I saw him, it was behind the palate and in a few moments, it was in the frontal sinus and shortly afterwards in the larynx. Of course no dime was found, much to his disgust. A general atrophic condition of the upper air passages was responsible for the different resting places of the coin.

Case No. 3. Major of adjoining town, aged thirty, was walking down the street and suddenly felt something drop into

his larynx. He at once suffered extreme discomfort in breathing, in fact almost suffocated, and was badly frightened when I saw him a few moments later. The most thorough examination failed to discover any foreign body in the larynx and as he had nothing in his mouth at the time, nor had there been since morning. I could only attribute it to a spasm of the Glottis. A spray of camphor mentholine gave instant relief.

Case No. 4. Engineer aged twenty-eight while walking down the street during a snow-storm, the handle of his umbrella became loosened from the staff. As it was attached with glue he put the staff in his mouth to moisten the glue in order to replace the handle. At that instant a gentleman ran against the other end of the umbrella and drove it with considerable force into his mouth. I saw him a few moments afterwards and found that the end of the staff had passed completely through the soft palate and a small piece of flesh was hanging down, nearly on a level with the base of the tongue, this was clipped off with a pair of scissors. Patient insisted that there was another piece in his larynx but I failed to find any foreign body there.

14½ Whitehall Street.

The Ophthalmic Record.

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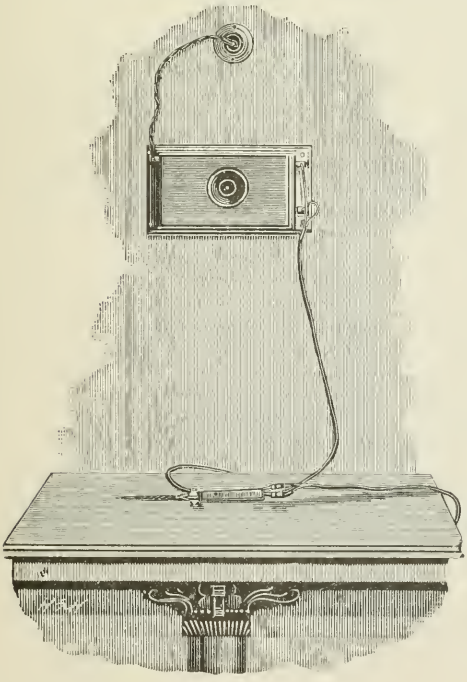

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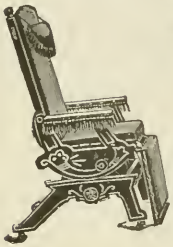

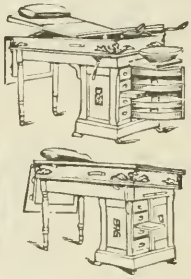

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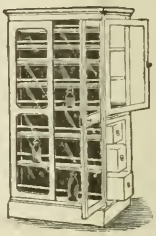

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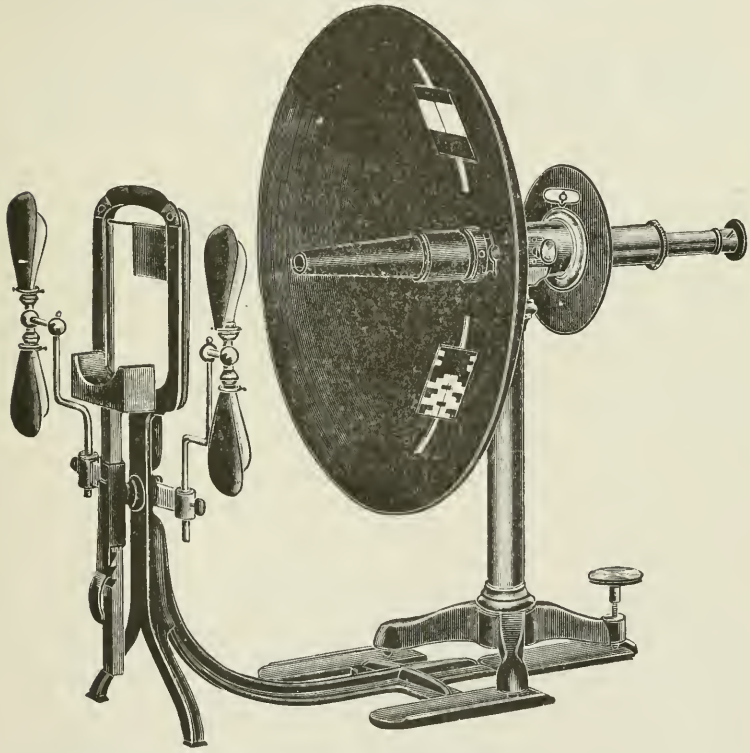

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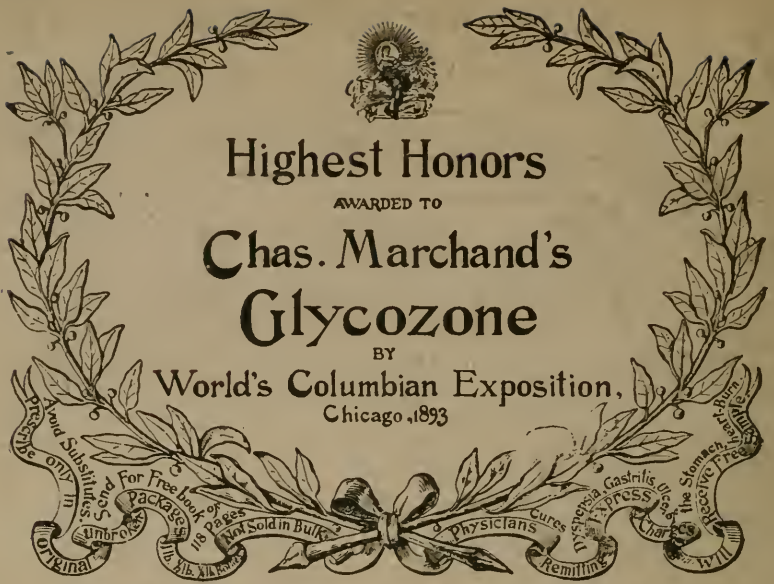

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